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The Chemical Weapons Convention Verification Regime: A Model For A New NPT?

by

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In January 1993, the Chemical Weapons Convention (CWC) was signed, completing the first step towards eliminating all chemical weapons. This treaty is the most comprehensive multilateral arms control treaty ever signed. The teeth of the CWC is a modern verification regime that includes traditional scheduled inspections as well as an innovative challenge inspection system: a party to the treaty may initiate a challenge inspection of another party if it believes there is a treaty violation. The CWC has been called a model for future arms control treaties.

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) has been in force for 25 years and has its fifth and final review conference in 1995. While the NPT has been both lauded and criticized over its lifetime, most authorities agree that it needs revision to meet the demands of the next century. One of the areas of the treaty requiring extensive review is the NPT verification process.

This thesis examines the verification procedures delineated in the CWC and discusses the possibility of creating a similar verification regime for the NPT. It addresses the reasons why the CWC inspection might work for the NPT. It also addresses security questions that must be considered by a technologically advanced state, like the United States, before considering such a verification regime for nuclear weapons and nuclear technology.

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EXECUTIVE SUMMARY

In 1995 two significant events are expected to occur, the 1995 Chemical Weapons Convention is expected to come into force and the fifth review conference for the Treaty on the Non-Proliferation of Nuclear Weapons will begin. Both treaties have been referred to as ground-breaking attempts to limit or eliminate the proliferation of weapons of mass destruction. At the same time, both attempt to respect the legitimate use of their respective sciences for peaceful purposes. This thesis addresses some of the similarities and differences between the verification parts of both the Chemical Weapons Convention (CWC) and the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). It assesses the applicability of the CWC verification regime to a new NPT verification regime. Verification is how nations assure themselves and the rest of the parties that signatories comply with a treaty. It has been called the *key* to arms control. It serves two purposes: to detect violations of an agreement, providing early warning to deny any advantage to violators; and to increase the risk of violation so parties would be reluctant to violate the agreement. The CWC addresses the process of verification directly, providing strict guidelines in the text of the Treaty itself. The NPT is less direct. It defers verification proceedings to International Atomic Energy Agency Safeguards, which are negotiated independently between the IAEA and each member state.

The Chemical Weapons Convention is a comprehensive multilateral agreement banning the production, use, stockpiling and transfer of all chemical weapons. It has been hailed as a trend setting approach toward the elimination of chemical weapons. It contains intrusive verification articles that are expected to facilitate the elimination of chemical weapons. For example, it contains a "challenge inspection" system. In addition to regularly scheduled inspections, the CWC provides for inspections to be held if one party believes another is violating the Treaty. Challenge inspections are not guaranteed; they may be denied by a three-quarters vote of an Executive Council if the Council believes the challenge is erroneous or abusive. But the challenge inspection system allows each party to take an active part in combatting the proliferation of chemical weapons. The CWC also provides various means of protecting national security and industrial secrets by using "managed access" techniques and allowing parties to review potential inspectors before they are appointed to inspection teams. Essentially, the CWC features a modern compliance system that might serve as a model for a new NPT.

But the NPT is not exactly like the CWC, and the differences are so important that they could preclude the use of the CWC's verification system. The most prominent of these differences is that the NPT was not created to eliminate nuclear weapons. It accepts their existence and only attempts to limit their horizontal proliferation. This makes verifying the treaty inherently more difficult; inspectors have to determine not only the presence of controlled or prohibited materials, but also the intent of the party possessing them. One reason the CWC verification regime is

expected to work is because after ten years, when all chemical weapons are supposed to be eliminated, the inspection teams need only prove the existence of certain chemicals, not their intended use.

Finally, there are security concerns that need to be addressed by technologically advanced nations like the United States. The CWC verification regime is more comprehensive that any IAEA safeguard. It covers not only chemical weapons facilities, but also their precursor chemical and delivery vehicle facilities. Translated to the nuclear industry, a verification regime similar to the CWC could be more intrusive than advanced nations would wish. Does the United States want to host international inspections of its nuclear powered submarines or other sensitive facilities? This question must be balanced against the added non-proliferation security gained by a more intrusive verification regime.

It is certain that the NPT negotiators have much to consider in 1995 when they attempt to engineer the Nuclear Non-Proliferation Treaty to meet the demands of the next century. Many parts of the CWC could serve as models in this respect. However, the United States must be careful in adapting the CWC verification regime to the NPT, the added security may not be worth the risk.

I. INTRODUCTION

A. CHEMICAL AND NUCLEAR WEAPONS NON-PROLIFERATION TREATIES

In 1995, two important events will occur: the 1993 Chemical Weapons Convention (CWC) will enter into force and the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) will be renegotiated after twenty-five years of existence. These treaties share much in common. Both are multilateral treaties, with signatories from around the globe. Both have been hailed as major steps toward eliminating weapons of mass destruction. Both attempt to address the difficult task of eliminating and controlling these weapons and their production facilities while at the same time, respecting the rights of nations to pursue peaceful industrial development.

There are differences between the treaties as well. Perhaps the most important difference is that the Chemical Weapons Convention is a new treaty that reflects current conditions. The NPT is a quarter century old, and is in need of revision. For example, one of its signatories, the Soviet Union, no longer exists, and its successor nations have resisted signing the NPT. Another signatory, North Korea, has developed a nuclear program and has refused to allow inspections of their facilities, in apparent violation of the NPT. When the negotiators of the NPT embark on the difficult task of negotiating the disposition of the NPT for the next century, they will have much to consider. The lessons learned from negotiating the new CWC may provide

valuable insight for renegotiating the NPT. This thesis will attempt to address the issue of modernizing one aspect of the both treaties: verification of compliance.

B. VERIFICATION OF TREATY COMPLIANCE

There are many definitions of verification; perhaps the simplest of them will serve best. Verification is the means by which nations assure themselves and the rest of the world that signatories comply with the tenets of a treaty. It is an extremely important part of arms control treaties. In fact, verification has been called the *key* to any arms control agreement.[1] Verification serves two purposes: first, to detect violations of an agreement, providing early warning to deny any advantage to violators, and second, to increase the risk of detection so parties will be more reticent to violate an agreement, thereby building mutual confidence between parties.[2]

Verification measures include the following four types of primary procedures:

- national technical means (NTM), such as satellite surveillance, air sampling, and communications intercepts,
- cooperative means, such as opening specific military systems to satellite surveillance,
- "soft" methods such as using agents, interviewing emigrants and analyzing information leaks, and

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[1]John G. Tower, et al, Verification, The Key to Arms Control, (Washington D.C: Brassey's (U.S.) Inc., 1992), *xv*.

[2]Richard Kokoski and Sergey Koulik, "Introduction: Setting the Stage," in Kokoski and Koulik eds. Verification of Conventional Arms Control in Europe, (Oxford: Westview Press, 1990), 7.

- on-site check points and inspections, and non-interference with means of verification.[3]

The verification process was the single most contentious issue in the CWC negotiations. Disputes about the on-site inspection procedures were the most dominant obstacle during the twenty-four years it took to complete the ban.[4] Although all of the above methods are widely used in comprehensive verification systems, the fourth method, on-site inspections, is the most intrusive, and therefore the most sensitive verification issue to negotiate.

The NPT is vague in delineating verification procedures and responsibilities. It defers the verification procedures to the International Atomic Energy Association (IAEA) in accordance with the IAEA Safeguard system.[5] The CWC, on the other hand, is very explicit in describing the inspection procedures to be followed by all signatories. This thesis will determine whether or not it is in the United States' interests to use verification procedures associated with the CWC for a new NPT verification regime.

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[3]Gloria Duffy, ed. Compliance and the Future of Arms Control, (Stanford: Stanford Junior University, 1988), 4.

[4]Jessica Stern, "All's Well the Ends Well?' Verification and the CWC, Verification Report," Lawrence Livermore National Laboratory, (to appear in Vertic, 1993), 3.

[5]NPT ART. III, para.1.

C. ASSUMPTIONS

This paper will make two assumptions. The first concerns treaties in general. This thesis assumes that most signatories to major treaties will act in good faith and cooperation to to uphold them. Although one does not have to search long to discover individual violations of treaties, they are generally upheld by a vast majority of their parties. Louis Henkin describes how nations generally uphold treaties. Although the description is somewhat dated, its meaning is still clear:

> A government generally observes the common treaty of friendship, commerce and navigation...because a breach would deprive it of the treaty's benefits. Breach of importnat treaties may bring other unwelcome consequences. Violation of [nuclear weapons treaties] by either the Soviet Union [sic] or the United States would mean that the other power would feel free to do likewise. ...Obviously only a major advantage from such a violation would seem worth the price.[6]

This paper assumes that the above mentioned "price" of violating a treaty is too high for most signatories and that the verification process will, in most cases, serve more in the "confidence building" capacity than in the "detecting violations" capacity.

The second assumption concerns the NPT. This thesis assumes that the fifth and final NPT review conference in 1995 will succeed in developing a nuclear non-proliferation program for the next century. Scholars differ in their predictions, but this assumption is based upon the fact that even though the recent review conferences of 1985 and 1990 have left important matters such as a comprehensive test ban treaty (CTBT) unanswered, they have all reaffirmed confidence in the NPT and the IAEA

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[6]Louis Henkin, How Nations Behave, (New York: Columbia University Press, 1979), 55.

safeguards.[7] Another argument for the NPT's continued success is its 25 year existence, despite its shortcomings. The 1995 review conference is the last conference required by the treaty, and although the outcome is not certain, it seems unlikely that modern states would desire a world without a treaty such as the NPT.

These two assumptions are necessary to create a working hypothesis and develop plausible answers based on known facts. The unknown facts, such as the outcome of the 1995 NPT Review Conference and the states' cooperation in the NPT or CWC could easily change any conclusions drawn in this paper.

D. THESIS ORGANIZATION

This thesis begins with a review of both the Chemical Weapons Convention and the Non-Proliferation Treaty. It will compare the intent of their designers as well as the major points of each treaty's content, paying particular attention to the verification procedures. Chapter III will discuss the CWC verification system at length. It will analyze the strengths and weaknesses of the Treaty's verification system. Chapter IV will discuss the possibility of applying the CWC verification system to the NPT in both theoretical and practical terms. The final chapter will recap the need for revision of the NPT, and discuss some limitations that, for security reasons, negotiators must consider if the NPT negotiators adopt a new verification system similar to the CWC.

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[7]Mohamed Ibraham Shaker, "The Legacy of the 1985 Nuclear Non-Proliferation Treaty Review Conference: The President;s Reflections," in John Simpson, Nuclear Non-Proliferation: An Agenda For The 1990's, (Cambridge: Cambridge University Press, 1987), 15-19.

II. THE CHEMICAL WEAPONS CONVENTION AND THE TREATY ON THE NON-PROLIFERATION OF NUCLEAR WEAPONS

A. THE CHEMICAL WEAPONS CONVENTION

1. BACKGROUND

The completion of the Chemical Weapons Convention marked a milestone in the effort to control the accumulation of weapons of mass destruction. The process by which the CWC was conceived and eventually signed took twenty-four years to complete. The idea of a multilateral treaty banning the use, production and storage of chemical weapons began, fittingly enough, in 1968, the year the Nuclear Non-Proliferation Treaty was signed.[8] After almost two and a half decades of difficult negotiations the Conference on Disarmament (CD) finally delivered the final draft of the CWC to the United Nations on September 3rd, 1992. The treaty was signed during a three day conference in Paris, January 13-15, 1993. It will enter into force 180 days after it is ratified by 65 countries, but not before January 15, 1995.

The Chemical Weapons Convention is a success in that it has drawn over 140 signatories, including several Arab nations which were not expected to sign.[9]

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[8]Charles C. Floweree, "The Chemical Weapons Convention: A Milestone in International Security," Arms Control Today, October, 1992, 3.

[9]Algeria, Tunisia, Mauritania and Morocco spurned an Arab League boycott and signed the treaty in January, 1993. The Arab League was boycotting Israel's refusal to open their nuclear facilities to international inspection. See William Drozdiak's

Perhaps this was evidence of a global determination to eradicate all chemical weapons. In her article "All's Well that Ends Well? Verification and the CWC" Dr. Jessica Stern cites three reasons why the treaty was finally signed after nearly a quarter century of "posturing and arguing." First, the superpower rivalry ended and many nations realized their security was no longer protected by the "rules" of the Cold War. Second, the threat of Chemical Weapons use in the 1991 Gulf War intensified interest in banning chemical weapons. Finally, the willingness and agility of the negotiators, especially in the final months of negotiations, were key factors developing an effective compromise.[10]

While nuclear weapons have been subject to the restraints of the NPT since 1970, and biological weapons by the Biological Weapons Convention of 1975, chemical weapons were restrained only by the 1925 Geneva Protocol. This agreement, created in the wake of the horrors of the First World War, had no verification provisions and banned only the use of chemical weapons, not their possession or production. The Geneva Protocol fell dramatically short as a comprehensive treaty on chemical weapons.

The CWC addresses the security needs of nations in the present and the future. It is considered unique among disarmament treaties for several reasons. First,

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"Historic Pact Bans Chemical Weapons," in the Washington Post, 14 January, 1993, A 24-25.

[10]Jessica Stern, "All Well That Ends Well? Verification and the CWC," Lawrence Livermore National Laboratory, (to appear in Verification Report, London: Vertic, 1993), 3.

it is the only global disarmament treaty that includes sanctions against non-signing nations. Second, the CWC has verification provisions that are broader and more inclusive than any other multilateral arms control agreement in existence. These provisions rival the verification measures incorporated into the Strategic Arms Reduction Treaty and other bilateral treaties between the United States and the Soviet Union.[11] Third, the CWC permits a so-called "challenge inspection" as part of the verification process. Essentially, any party nation that believes another nation has violated the treaty may issue a challenge to the Executive Council of the CWC, which is bound to answer the challenge in accordance with guidelines in the CWC.[12] One other reason the CWC is a landmark treaty is that it establishes an entire new organization to govern, administer, and verify the tenets of the CWC, the Organization for the Prevention of Chemical Weapons. Figure 1 shows a brief comparison between major verification provisions of the CWC and the NPT.

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[11]The verification procedures of the CWC are discussed at length in Chapter III.

[12]Further discussed in Chapter III. See also, Alan Riding, "Signing of Chemical Arms Pact Begins," New York Times, International, January 14, 1993, A-16.

	CWC VERIFICATION SYSTEM	NPT (IAEA SAFEGUARDS)
VERIFICATION SYSTEM GUIDELINES	IN CWC AND CWC ANNEX	IN SEPARATE IAEA SAFEGUARD AGREEMENTS
SIGNATORY ACCOUNTABILITY	ALL ACCOUNTABLE TO ONE CWC VERIFICATION REGIME	INDIVIDUALLY NEGOTIATED SAFEGUARDS
MATERIALS SUBJECT TO INSPECTION	ALL SCHEDULED CHEMICALS AND THEIR PRECURSORS	LIMITED FISSIONABLE AND SOURCE MATERIAL, SOME NON-NUCLEAR MATERIALS
INSPECTED FACILITIES	ALL CHEMICAL PRODUCTION, DESTRUCTION AND STORAGE FACILITIES	PREDETERMINED FACILITIES
CHALLENGE INSPECTIONS	YES	NO
SANCTIONS AGAINST NON-SIGNERS	YES	NO

FIGURE 1

2. CWC ORGANIZATION

The major governing body created in the CWC is the Organization for the Prohibition of Chemical Weapons (OPCW). It will be established in the Hague, and may eventually employ up to 1000 personnel.[13] This organization is entrusted with implementing and administrating the CWC. It is, in many aspects, similar to the International Atomic Energy Agency (IAEA), but it will have much greater authority for overseeing the functions of the CWC than the IAEA does for the NPT. The

[13]Floweree, 5.

OPCW is expected to monitor more closely such matters as rights and immunity of inspectors, inspector designation, and procedural arrangements. CWC planners anticipate that the OPCW will be able to establish a stronger OPCW management program than the IAEA for many reasons, several of which are:

- The OPCW has one responsibility, the eradication of chemical weapons. It is not charged with the additional mission of promoting the peaceful use of chemicals. The IAEA has a dual mission, countering proliferation and promoting peaceful nuclear science.
- The OPCW has only one legal foundation, the CWC, while the IAEA has IAEA Statutes, the NPT, Treaties of Tlatelolco and Rarotonga, IAEA Safeguard Agreements and others.
- The OPCW verificatin regime is delineated for all partiesin one document, the CWC. The IAEA follows safeguard agreements for each member state.[14]

While the amount of chemicals the OPCW is expected to monitor far outnumbers the amount of nuclear material monitored by the IAEA, the OPCW has a more focused approach. It has only one mission, the legal foundation and administrative guidelines of which are all on one place, the CWC.

The OPCW is composed of three elements, the Conference of the States Parties, the Executive Council and the Technical Secretariat.

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[14]A. Walter Dorn and Ann Rolya, "The Organization for the Prohibition of Chemical Weapons and the IAEA: A Comparative Overview," IAEA Bulletin, Vol. 35, No. 3, 1993, 44.

a. The Conference of the States Parties

The Conference of the States Parties is the supreme body of the OPCW that oversees broader aspects of the operation of the Convention. It takes action in cases of non-compliance and performs a variety of administrative functions, such as appointing department heads and debating budgetary concerns. It meets once a year to oversee the treaty operation, and whenever important matters dictate the need for additional meetings. In cases of non-compliance, the Conference can restrict or suspend privileges of the offending state, or may recommend collective measures such as sanctions. In extreme cases, the Council may refer the matter to the U.N. General Assembly or Security Council.

b. The Executive Council

The Executive Council has a rotating membership of 41 countries, selected on a basis of equal regional distribution, with a certain number of seats reserved for the nations with the largest chemical industries. During the periods when the Conference of States Parties is not in session, the Executive Council oversees the operational and administrative functions of the CWC. It also oversees the operation of the Technical Secretariat and maintains a data bank of information on protective measures against chemical weapons. One of the most important tasks of the Council is the receipt and processing of challenge inspections.[15] Upon receipt of the data

[15]See chapter 3.

retrieved from all inspections, the Council makes recommendations to the Conference of States Parties for appropriate action.

c. The Technical Secretariat

The Technical Secretariat carries out the day-to-day activities of the OPCW. These activities include managing the reporting functions required by the CWC, organizing routine and challenge inspections, and supervising the inspectorate. The Technical Secretariat is headed by a Director-General who is appointed by the Conference of States Parties. The bulk of the Technical Secretariat will initially be running the systematic inspections of declared weapons facilities and commercial plants. The Technical Secretariat is required to protect all confidential information it acquires from declarations and inspections.[16]

The United States expects to utilize the Department of Defense's On-Site Inspection Agency (OSIA) for preliminary inspections and later, as inspection escorts. Created by President Ronald Reagan in 1988, the OSIA was was instituted as a mechanisim to verify the Intermediate Nuclear Force (INF) treaty of 1987. It's success has led U.S. CWC planners to believe it will serve their domestic needs as well.[17]

d. The Preparatory Commission

A preparatory Commission had been convened by the CWC to develop the rules and procedures for the OPCW, select a Director-General, decide preliminary

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[16]"Summary and Text of the CWC" Arms Control Today, CWC Supplement, October, 1992, 3.

[17]Robert W. Parker, Major, USAF, "Trust But Verify," Defense 93 1, 1993.

budgetary and personnel questions, develop further guidelines for conducting investigations and oversee the countless administrative tasks required to ensure the OPCW is prepared to run the CWC by 1995.[18] The work of the Preparatory Commission is expected to take two years, which is the reason why the CWC will not be enacted into force before January 15th, 1995, even though it is expected that 65 states will have ratified the treaty before then.

3. CWC CONTENT

A full account of the content of the CWC would simply be an annotated reproduction of the treaty. However, several elements are of substantial importance dut to their originality and and possible application to the NPT. These elements single the CWC out from other multilateral arms control treaties, and are part of the reason the CWC is considered a landmary in arms control treaties.

a. All Countries Share The Same Standard

A fundamental difference between the CWC and the NPT is that the latter acknowledges the existence of nuclear weapons and tries to prevent further proliferation of States producing them, while the CWC is aimed at the total eradication of chemical weapons.[19] This difference in theme is reflected in the fact that the CWC does not differentiate between the states that possess chemical weapons and the ones

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[18]The description of the Preparatory Commission's tasks covers more than five pages of CWC Annex text.

[19]ter Haas and de Klerk

that do not. The NPT clearly separates the world into nuclear-weapon and non-nuclear-weapon states with different obligations and rights. In the CWC all states are represented from the same level, working toward a common goal.[20] This strategy both lends itself to the ultimate goal of the CWC and also prevents any of "have's versus have-not's" problems which occasionally erupt in NPT negotiations.

b. Scheduling of Weapons

Perhaps one of the greatest accomplishments of the CWC is the categorization of the many chemicals used as weapons or as precursors to weapons. Before the CWC, no such attempt was made. The ambiguities of chemical weapons production, such as determining the classification of precursor or dual-use chemicals, made negotiations extremely difficult.[21] Article II of the CWC defines chemical weapons as "all toxic chemicals intended for purposes other than those permitted by the convention, which include peaceful uses, chemical production, military purposes not involving toxic chemicals as a method of warfare and law enforcement." Additionally, the term "chemical weapons" also includes these chemicals' precursors, the munitions and devices designed to deliver them and equipment "specifically designed" for their use in warfare. All chemicals regulated or prohibited in the CWC are grouped into three categories, or "schedules," as defined below:

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[20]With the noted exception that in the Executive Council states with larger commercial chemical industries will have seats automatically held for them.

[21]James F. Floweree, "Rolling Back Chemical Proliferation," Arms Control Today, October, 1992, 19.

- Schedule 1. Schedule 1 chemicals have been stockpiled as weapons or represent a "high risk" to the objects and purpose of the CWC. Examples of these chemicals are nerve agents and mustard gas.

- Schedule 2. Schedule 2 includes those chemicals that are lethal chemicals or their precursors that pose a "significant risk" to the goals of the CWC and are not generally "produced in large commercial quantities."

- Schedule 3. Schedule 3 chemicals include other chemicals that pose "a risk" but are produced in large quantities for commercial use.[22]

These schedules are used for determining the amount of material that may be produced or stored at a facility, the frequency of inspections at a given site, the degree of scrutiny of an inspection and the level of intrusiveness of production/destruction monitoring. The system of scheduling the chemicals is one the methods that will be used by the CWC to protect national and commercial security. More commonly used chemicals that pose little threat are inspected with more respect for commercial security than chemicals considered to be of higher risk.

c. Incentives for Non-Signers

An element of the CWC that shows illustrates its global reach is the manner with which non-signers are addressed. The treaty uses a number of both "carrots" and "sticks" as incentives for nations to sign. Defensive assistance is one "carrot." States facing chemical threats or attacks are entitled to assistance, including defensive equipment, sensors, protective clothing, antidotes, and technical expertise.

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[22]Riot control agents, such as tear gas, are not actually scheduled,but are defined as chemicals that "can produce rapidly...sensory irritation or disabling physical effects which disappear within a short time." These agents are also prohibited "as a method of warfare," but not regulated as the other chemicals. The CWC also prohibits the use of chemical defoliants for military purposes.

All parties able to do so are directed to contribute, either directly or through a "voluntary fund" administered by the Technical Secretariat. Another "carrot" is a chemical trade allowance and assistance provision. Article XI encourages parties to "participate in the fullest possible exchange of chemicals, equipment and scientific and technical information...for purposes not prohibited." The CWC does not bar states from imposing national controls on transfers of sensitive chemicals to other countries, but it does require that they "review their existing regulations in order to render them consistent with the object and purpose of [the CWC]." The Australia Group, a major chemical suppliers cartel, has already announced that it will institute such a review, potentially easing chemical trade restrictions for signers of the CWC.[23]

On the other hand, those countries that do not sign the CWC will be subject to trade sanctions that will prevent them from obtaining many types of dual-use chemicals from major suppliers. Nearly all major suppliers have signed the CWC, which means non-signers will have little to no access to the restricted chemicals. Over time this isolation of non-parties could cause some CWC holdouts to sign the Treaty, just as the ranks of NPT parties have swelled over the years.[24]

B. The Treaty on the Non-Proliferation of Nuclear Weapons

Over the past 25 years there have been numerous works about the Nuclear Non-Proliferation Treaty, covering its history, use, effectiveness and future. This section

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[23]"CWC Text Review," 4.

[24]Floweree, 7.

will defer any lengthy description of the NPT to those works and will only briefly touch on the birth of the NPT, its organization, and content.

1. Background

The need to prevent the spread of nuclear weapons became clear in the earliest days of the nuclear era. But early efforts to curb nuclear proliferation failed. The Soviet Union became a nuclear-weapon state in 1949, the United Kingdom in 1952, France in 1960, and the Peoples Republic of China in 1964.[25] It was evident that the earlier assumptions about the scarcity of nuclear materials and the difficulty in mastering nuclear technology were inaccurate; there was a smaller natural scientific barrier nuclear proliferation than ear;ier believed.

On August 24, 1967, the Unites States and the Soviet Union submitted identical treaties to the United Nations' Eighteen-Nation Disarmament Committee (ENDC). This event marked the end of years of negotiations, mainly between the Soviet Union and the U.S. The General Council debated the treaties extensively; the concerns of non-nuclear powers covered three main areas:

- Safeguards. The U.S.S.R insisted that all non-nuclear nations accept IAEA safeguards, including those countries in the European Atomic Energy Community (EURATOM). An agreement was reached where all nations could negotiate with the IAEA individually or as a group.[26]

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[25]"Treaty on the Non-Proliferation of Nuclear Weapons," Arms Control and Disarmament Agreements, (Washington D.C: United States Arms Control and Disarmament Agency, 1990), 89.

[26]Euratom and the IAEA began negotiations in 1071. An IAEA-EURATOM agreement was signed in 1973 and enacted into force in 1977.

- Balanced Obligations. The non-nuclear countries held that their renunciation of nuclear weapons should be accompanied by a commitment on the part of nuclear countries to reduce their arsenals and progress toward disarmament. General provisions to this effect were added to the NPT, along with guarantees that benefits derived form peaceful nuclear explosions would be shared with non-nuclear counties.

- Security Assurances. The non-nuclear countries sought guarantees that they would not be at a permanent military disadvantage and remain vulnerable to nuclear-armed countries. The United States, United Kingdom and Soviet Union submitted a tripartite proposal that such assurances take the form of a U.N. Security Council Resolution.[27]

Once these hesitations were met, the treaty was opened for signature in July 1, 1968 and signed on that date by 63 countries. It was finally ratified by the United States in March, 1969 and entered into force on 5 March, 1970.

2. NPT ORGANIZATION

While the OPCW was created to administer the CWC, the NPT gives these responsibilities to the previously created International Atomic Energy Agency, an autonomous organization linked to the U.N. General Assembly.[28] The IAEA was created to:

> Seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world; ensure,[that] assistance provided by it...is not used in any way to further any military purpose.[29]

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[27]"Arms Control and Disarmament Agreements," 93.

[28]The IAEA was established July 29, 1957 on the basis of a decision by the U.N. General Assembly after eighteen states deposited the necessary instruments of ratification with the United States Government. Other similar U.N. affiliates are the International Monetary Fund, the World Health Organization and the World Bank.

[29]Yearbook of International Organizations 1993/1994, Union of International Associations, (London: K.G. Saur Pub. 1993) 819.

Based in Vienna, the IAEA reports annually to the General Assembly. In the event the IAEA detects a safeguard violation it can submit a report to the U.N. Security Council. The IAEA consists of three main bodies, the General Conference, the Board of Governors and the Inspector General.

a. The General Conference

The General Conference is comprised from representatives of each of the IAEA's 120 member states.[30] It meets annually to approve programs and budgets for the upcoming year, and to consider recommendations from the Board of Governors. It also elects new members to the Board of Governors, and new officers for its own ranks for each new season.

b. The Board of Governors

The Board of Governors is a smaller group consisting of 13 members elected by the Board itself and 22 members elected by the General Conference. The Board meets about six times a year and is responsible for carrying out the functions of the Agency. It also deliberates on specific policies and programs, approves new states for membership and selects the Director General of the Agency. While considered the preeminent body of the IAEA, it submits most of its findings to the General Conference for final approval.

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[30]"Membership List," IAEA BULLETIN 65 (January, 1993), to which has been added Croatia, Slovenia and Uzbekistan.

c. The Director General

The Director General is appointed to a four year term and is designated as the chief administrative officer for the IAEA. He presides over the Secretariat and is responsible for the administration and implementation of the Agency's program. He is assisted by five Deputy Directors General, each head of a department (Administration, Technical Cooperation, Nuclear Energy and Safety, Research and Isotopes and Safeguards).

3. NPT CONTENT

In its basic framework the provisions of the Nuclear Non-Proliferation Treaty are:

- To prevent the spread of nuclear weapons. (Art. I and II);
- To assure that peaceful nuclear activities do not become diverted into making weapons (ART. III);
- To promote to the maximum extent possible, the peaceful uses of nuclear energy through full cooperation (ART. IV and V);
- To express the determination that the signatories should continue further progress in comprehensive arms control and nuclear disarmament measures (ART. VI).

It should be noted that these provisions are aimed at curtailing the spread of nuclear weapons, not the complete eradication of them, as in the CWC.

a. Two Types of Parties to the NPT

The NPT divides the world into two distinct groups, those states with nuclear weapons (NWS) and those states without them (NNWS). From the beginning

of the treaty, this "two-class structure"[31] has been the cause of discontent, especially among the NNWS states in matters concerning mandatory IAEA safeguards. Although all of the NWS parties have *voluntarily* accepted the safeguards, the NNWS *must* accept them upon joining the IAEA. Recently, one of the former Soviet Republics, Kazakhstan, has illustrated this dichotomy between the NWS and the NNWS. Kazakhstan inherited 104 SS-18 ICBM's when it gained its statehood from the Soviet Union. Although Russia still claims CIS control of these weapons, Kazakhstan's President Nursultan Nazarbayev has maintained that his state should be allowed NWS status when signing the NPT. Skeptics claim this was simply a move to gain more global attention, but it does raise the question of defining new NWS members. Ukraine, another former Soviet state has raised similar arguments.[32] In the 1995 NPT conference, the parties will need to address the problem of erasing the dividing line between the NWS and NNWS states, while ensuring their respective security needs.

b. Conferences For Updating the NPT

Article VII of the NPT requires that a conference be periodically held to review the operation of the treaty and to assure that "the purposes of the Preamble and the provisions of the Treaty are being realized." Upon reaching the treaty's 25th year in 1995, the parties will meet to determine whether the CWC will be extended for an additional fixed period or periods.

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[31]Leonard, 13.

[32] John Lepingwell, "Kazakhstan and Nuclear Weapons," RFL/RL Report Vol. 2, No. 8, 19 February, 1993.

The review conferences, which have been held held every five years beginning in 1975, have shown strong support for the treaty by its parties, as well as strong support for the IAEA safeguards. Most conferences have recommended that greater efforts be made to make them more universal and effective. But each successive review conference also showed a growing reluctance to complete any final declarations.[33] Items such as finishing a Comprehensive Test Ban Treaty (CTBT) and negotiations with "threshold nations"[34] keep any hope of final closure on the NPT away. The 1995 review conference may be the final chance to reach these vital conclusions.

4. IAEA SAFEGUARDS

The IAEA constructed a series of safeguards, or standards by which all nuclear and non-nuclear parties to the NPT must abide. The safeguards are tools by which the IAEA implements goals of the NPT. The ultimate purpose of these safeguards is to provide international assurance that nuclear materials and activities

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[33]See John Simpson's Nuclear Non-Proliferation: An Agenda For the 1990's, (Cambridge: Cambridge University Press, 1987).

[34]"Threshold countries" such as Pakistan, India and North Korea have advanced nuclear programs but have not openly declared possession of nuclear weapons. Additionally, Belarus, Kazakhstan, and Ukraine were all "born" with former Soviet nuclear weapons on their soil. The NPT currently has no provisions for either type of state.

under safeguards have not been used for the manufacture of nuclear weapons or other proscribed military purposed.[35]

The safeguards are actually a system of verification procedures designed to create a feeling of confidence that a party is acting in compliance to the NPT. They comprised the first systematic international verification system, and consist of systematic announced and unannounced inspections using various methods of verification. The three most common, material accounting, containment/surveillance and on-site inspections are described below.

a. Material Accountancy

NPT safeguards require that a party establish and maintain a national system of accounting for and control of all nuclear material subject to safeguards, including such information as location, quantity, and form. The State and the IAEA has access to these records, and use them as a basic tool for nuclear material management. The aim of material accountancy is to determine the amount of Material unaccounted for (MUF) over a specific period, which could be used to prove or disprove suspicions that nuclear material has been diverted for prohibited purposes.

b. Containment and Surveillance

An effective materials control system can be greatly enhanced by appropriate containment and surveillance (C/S) measures. Two examples of C/S

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[35]Frances Mautner-Markhof, "The IAEA Experience," in R. Kokoski and S. Koulik eds. Verification of Conventional Arms Control in Europe, (Oxford: Westview Press, 1990), 223.

systems are seals and surveillance cameras. Seals can be placed on containers by the IAEA to ensure that inspected material has been unchanged since the seal was applied. Only the integrity of the seal needs to be checked, making verification procedures easier and cheaper. Surveillance cameras can be positioned to support states' declarations about facility operations.

c. On-Site Inspections

On-site inspection is crucial to confirm the veracity of the data obtained by the first two methods.[36] The IAEA carries out inspections for various purposes, including verification of both material security, proper record keeping and quality control. The inspectors gather independent information, evaluate the data, formulate conclusions about the inspection and prepare detailed reports for the inspected state and the IAEA. Sample testing may be conducted on-site or at the IAEA Safeguard Analytical Laboratory (SAL) in Vienna.[37] If the inspectors find a possible misuse or misplacement of materials, they may request a "special inspection". Special inspections are used to send inspectors to places not originally specified in the safeguard agreements. Unannounced inspections may be used in similar fashion to clarify discrepancies.

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[36]Kokoski and Koulik, 258.

[37]IAEA Bulletin (January, 1990), insert.

C. CONCLUSIONS

It is obvious that the CWC was modeled after the NPT in many ways. But there are some major differences. The treaties both intend to limit weapons of mass destruction while respecting the legitimate, peaceful uses of nuclear and chemical technology. However, the CWC is directed toward complete chemical disarmament. The NPT accepts nuclear weapons as existing and is dedicated to halting the horizontal spread of such weapons. Both are large, multilateral treaties, open to any and all nations. However, the CWC addresses all nations equally; whether they currently possess chemical weapons or not, the same regulations apply to each of them. The NPT divides the parties into two categories, the "Have's" and the "Have Not's." It then affixes different IAEA safeguard requirements on them, based on whether or not they are nuclear armed. The CWC has proposed both positive and negative incentives for non-signers, while the NPT does not address non-singers at all. The administration of each treaty is similar too. The OPCW is very similar in form to the IAEA. The share the same internal administrative and hierarchical form, and share the same status vis a vis the United Nations. Both receive funding through their member states in accordance or guided by the U.N. scale of assessment. But the CWC is designed to have more control over the parties, especially in terms of the treaty verification process. By design the OPCW has a more focused mission, clearly described in one document.

Compared to the CWC, the NPT shows a need to address current problems that will continue to affect its use until they are resolved, such as the CTBT issue. The

review conference of 1995 could be the forum to address these issues, or it could be the forum for failure. Perhaps, in fitting irony, the NPT negotiators could use some of the CWC as a model for the 1995 update of the NPT.

III. INTRUSIVE VERIFICATION

A. TRENDS IN WEAPONS VERIFICATION PHILOSOPHY

Since the first arms control agreements were reached in the nineteenth century, the general approach to arms control has changed dramatically. Until after the First World War the emphasis of arms control was on the *use* of certain types of weapons. The goal was simply to prevent atrocities caused by using weapons considered to be beyond the goals of war. After the War, it was determined that a state could not feel secure while a neighbor was stockpiling weapons, so *production and stockpiling* became the focus of arms control treaties. Compliance with such treaties could, at least theoretically, be verified before a State was able to stockpile a militarily significant amount of controlled weapons. During the 1980's, arms control verification had become much more complicated than ever before. No significant arms control agreements were reached, except for the intermediate-range Nuclear Forces agreement.[38]

There began a tendency to change arms control from limiting numbers of weapons to eliminating the *steps* that could lead to production and stockpiling. This trend was seen in the 1986 Biological weapons Convention where it was agreed that

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[38]Seong W. Cheong and Niall Fraser, "Arms Control Verification: An Introduction and Literature Survey," Arms Control, Vol. 9, No. 1, May, 1988, 42.

member states have to identify those laboratories in which new biological weapons could be developed.[39] The trend can be easily illustrated in figure 2:

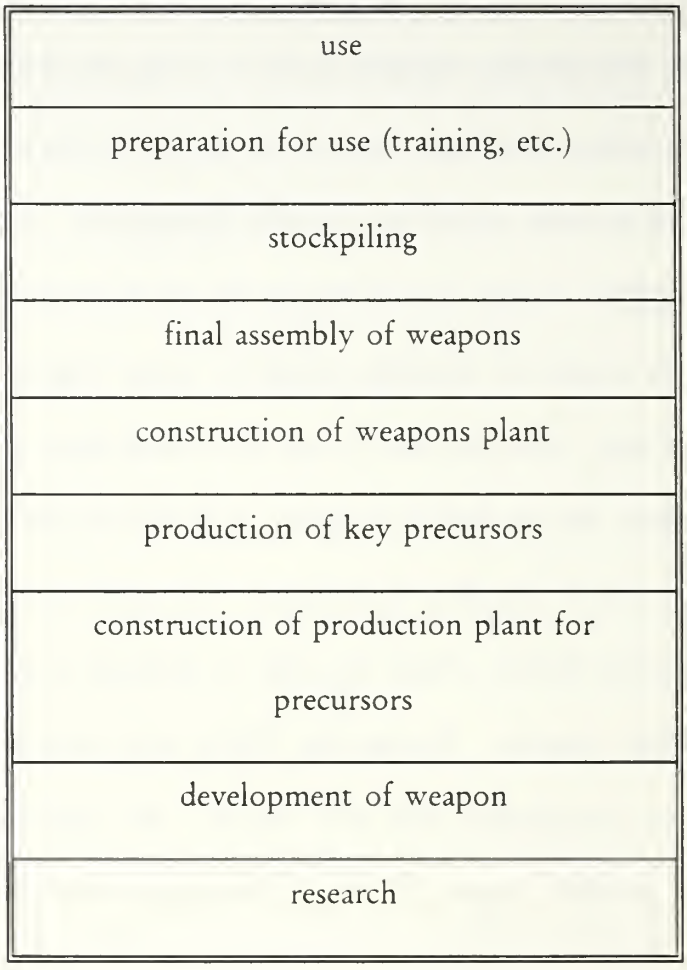

Figure 2

The change of emphasis in arms control and disarmament has resulted in a move "down the ladder" of the weapons production process over time. After World War One, the emphasis would have been at the top of the chart, restricting the use of

[39]ter Haar and de Klerk, 197.

weapons. The CWC has shifted emphasis as far down to, in some cases, the "production of key precursors" level.[40]

B. THE CWC VERIFICATION REGIME

Many of the details of the CWC verification process remain to be determined by the Preparatory commission, but the treaty and its annexes provide the basic verification design. The inspection regime created by the CWC is a two-pronged system designed to facilitate the verification process while at the same time preserving national and commercial security. The first part of the verification process consists of a routine inspection regime. These inspections are similar to the IAEA inspections. The second part is comprised of an on-site "challenge" inspection system. In either type of inspection, inspectors are allowed to collect physical samples for chemical analysis. The results of such analysis may be a major factor in the evidence gathered by the inspection team, but inspectors will not make findings on at the inspection site. They will only collect factual information to be used in later evaluation.

But the verification process for the CWC commences before the first inspection ever begins. Article III, Annex 2 of the treaty requires extensive declarations and openness to provide an accurate baseline from which the reduction will commence. Within thirty days after signiong the CWC, each signatory had to provide an accurate accounting of all chemical weapons production and storage facilities, including a precise location and a complete inventory. Also, the signatories had to provide a "general

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[40]ter Haar and de Klerk, 200.

plan" for the destruction of both weapons and their production facilities. Furthermore, the states were required to declare all facilities that produce Schedule 1,2, or 3 chemicals in excess of predetermined amounts.[41] Parties had to declare whether they had transferred or received any chemical weapons since 1946, and if so, provide information concerning the transfers. Finally, they had to declare the types and amounts of riot control agents in their possession. The Technical Secretariat is to carry out the inspections based on these reports, conducting initial inspections at the declared sites.

1. Routine Inspections

The systematic inspection regime detailed in the CWC calls for the random selection of sites for inspection based on an equitable geographical distribution and the nature of the activities carried out in various locations. All chemical weapons facilities are subject to systematic inspections at a frequency that remains to be determined by the OPCW Preparatory Commission. However, no state is required to submit to more than 20 inspections in one year, and no weapons production site is required to receive more than four inspections in one year.[42]

The inspectors have the right to "unimpeded access" to all parts of the weapons storage facilities, including all the munitions and containers and any "specific

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[41]Other organic chemicals, not on Schedules 1,2,or 3 but still considered possible weapons precursors under the CWC also had to be declared if produced in greater than specified amounts.

[42]Declared chemical weapons productions plants are subject to a maximum of four inspections a year to ensure they are not used, however, permitted chemical production plants are subject to only two inspections a year. This does not include challenge inspections.

buildings or locations" they choose. The inspectors have similar unimpeded access to destruction sites. Inspected states are given no less than 48 hours advance warning before the inspection. To monitor destruction, the inspectors may use continuous monitoring devices and may obtain sample analysis. At weapons production sites the inspectors may use seals to ensure that a facility is not being used. These seals use a variety of methods to determine if a previously inspected container has been opened. This technique greatly reduces the amount of time wasted by reinspecting containers.

The level of scrutiny with which permitted chemical production facilities are inspected depends on the sensitivity of the activity in each plant. Facilities that produce or did produce Schedule 1 chemicals are more intensely inspected than those producing Schedule 2 or 3 chemicals. States are required to provide accurate declarations of production at permitted facilities. While the "unimpeded access" rule is the same as it in weapons production facilities, this will be only for the initial inspection. For subsequent inspections at Schedule 2 chemical facilities the access given to the inspectors will be determined based on the risk of the chemicals involved. Inspection arrangements will be determined in "facility agreements" for each site. Similar arrangements are made for Schedule 3 chemical production facilities. However, many inspection guidelines are altered to favor the production site and protect commercial security. For example, the inspection team must give 120 hours notification, and much of the access given to inspection teams will depend in part on cooperation with the host state.

2. Challenge Inspections

If it believes the treaty is being violated, any party to the treaty may initiate a challenge inspection of any site or facility. The requesting party submits its request to both the Executive Council and the Technical Secretariat. The Executive Council may block an inspection within twelve hours if they find the request frivolous or abusive. The challenge must be blocked by a three-quarters vote of the Executive Council. The director general must give twelve hours notification to the inspected state, regardless of whether the council plans to reconsider the challenge, and must determine if the challenge is legitimate within the twelve hours.

The challenging party designates a perimeter on the site which must be at least ten meters outside any buildings or security fences at the site. The inspected party may propose an alternate perimeter which must at least include the original perimeter and "bear a close resemblance to it." On this perimeter the inspectors may use a variety of monitoring equipment, take air, soil and effluent samples and monitor traffic going to and from the site. Within 108 hours of their arrival, the inspection party must be allowed into the originally proposed perimeter. The inspected state may utilize "managed access" techniques for the inspection. This approach allows the inspected party to protect national and commercial security by, among other things, shrouding computer displays, removing sensitive papers, and restricting the tests to determining only the presence or absence of suspected chemicals. In addition, the inspected state may request that the inspection team use "random selective access techniques" in which inspectors have access to only a certain percentage of the

buildings selected at random. In "exceptional cases" the inspected state may allow access to individual inspectors, not the entire team. The entire inspection may last no longer than 84 hours. There are also provisions for inspecting any suspected use of chemical weapons, including access to hospitals, refugee camps and other relevant locations.

In addition to the findings of the inspection, the report filed with the Executive Council will include a discussion of the inspected state's compliance to CWC regulations and treatment of the inspecting party by the host state, its escorts and the inspected facilities.

The provisions of for the mandatory on-site challenge inspection program provide a powerful deterrent to prohibited activities. At the same time the provision for the convention's Executive council to reject frivolous and abusive requests will prevent the exploitation of this program.[43]

3. The Inspection Team

The Inspector General determines the size and composition of each inspection team. The team is comprised from lists of nationals submitted by each participating state. National governments may strike proposed inspectors from the list within thirty days of when they are submitted, but after that, the onus is on the inspected state to accept the designated inspectors. An observer from the challenging

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[43]Spurgeon M. Keeny Jr. "Paying For a Chemical-Weapons Free World," Focus, October, 1992, 1.

state may accompany the inspecting team, although that individual's access may be more limited than that of the inspecting team, if the host country chooses.[44]

C. ANALYSIS OF THE CWC VERIFICATION REGIME

The short-term success of the Chemical Warfare Convention can be measured by its surprising number of signatories. Long-term success will depend on the implementation of the treaty, which will rely heavily on intrusive verification to enforce it. A combination of measures outlined in the CWC will raise the expected cost of violating the CWC, but the violators must be caught.[45] For this reason, the success of the CWC verification regime is crucial to the overall success of the treaty.

The CWC verification regime addresses the difficult balance between the need to maximize the deterrent value of the treaty and the need to protect commercial or government secrets in an a difficult environment. By utilizing new concepts like "managed access," the perimeter system and Executive Council veto of challenge inspections the CWC attempts to alleviate any party's fears of security compromise.

The chemicals that can be used as chemical weapons vary from nerve agents that have almost no civil use to less toxic agents such as chlorine and phosgene which are used for civil purposes in enormous amounts. The diversity is even greater in the case of precursor chemicals. This variety, makes it difficult to design a comprehensive

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[44]Leonard, 22.

[45]The treaty maintains a mechanism for imposing sanctions and "collective measures" within the scope of international law. In extreme cases, violations may be called to the attention of the U.N. General Assembly and Security Council.

verification regime. The previously discussed scheduling of chemicals according to their known civil and military use will greatly facilitate the verification process by varying the intensity and frequency that the chemicals will be inspected. Additionally, a characteristic of chemical weapons is the relative ease with which they can be manufactured in secret. The CWC addresses this problem with two features: its inspections cover not only specific chemical weapons storage and production sites, but also any facilities at which cheating could *potentially* exist; and the challenge inspection program.[46] There are some additional factors to be considered, listed below.

1. Material Accounting of Chemical Weapons and Precursors

Material accounting of civil-use chemicals will be difficult under the best of circumstances. For schedule 1 and most schedule 2 chemicals the accounting process may be feasible, but for schedule 3 chemicals, accurate material accounting may prove impossible. The chemical industry works with a nearly infinite variety of chemicals, a small portion of which are used for chemical weapons. Many of these chemicals are produced in quantities of thousands of metric tons. The amount of material unaccounted for (MUF) may be only 1 percent annually, yet it this may actually be tons (or in the case of widely used chemicals such as phosphorus trichloride, hundreds of tons a year.)[47] Given the nature and scope of the chemical industry, the CWC

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[46]Jessica Stern, "Stragtegic Decision Making, ALliances and the Chemical Weapons Convention," TMs Lawrence Livermore Laboratory, (to appear in Security Studies Winter, 1994) 1993, 10.

[47]ter Haar and de Klerk, 208.

verification is tremendous undertaking. In order to allow the CWC to realize its full potential, surprise or unannounced inspections should not be the exception, but rather the rule. This would offset the material accountability that is "protected" by the large amounts of chemicals used, and enhance the deterrent effect of the inspection regime.[48] The CWC does provide for the use of continuous monitoring devices such as seals and cameras similar to IAEA apparatus for monitoring nuclear weapons destruction, but the chemical process is more diffuse in nature. It may take time to develop and integrate the sophisticated instruments needed for properly monitoring chemical production.[49] While the Preparatory Commission continues its work to implement the CWC, several obstacles, illustrated below will be major considerations.

2. Political Commitment Abroad

The Benefits of the CWC will not be obtained without top-level political commitment and policies drafted at the state level to provide effective treaty implementation. The challenge will be to make the convention work on a domestic as well as an international level. International challenges include gaining additional signatures from those countries that have not already signed, and ratification from those that have. The governments that have not signed must be briefed on CWC sanctions, especially the trade restrictions that will be imposed on non-parties once the

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[48]ter Haar and de Klerk, 209.

[49]ter Haar and de Klerk, 210.

treaty enters into force. In addition, these governments may require legal and technical assistance by OPCW experts.[50]

3. Domestic Considerations

Domestic obstacles include instituting domestic legislation to enforce the CWC while respecting current domestic law. A good example of the need for domestic policy is in the United States. Considerable attention has been given to the constitutionality of implementing the CWC inspection and verification regime at private facilities. The Fourth and Fifth amendments to the U.S. Constitution provide powerful safeguards against unreasonable searches and seizures, which could occur during CWC inspections.[51] But potential constitutional conflict should not be a barrier for the United States or any nation to ratify or sign the CWC for two reasons. In fact, the only kind of U.S. facility that might remain immune from inspections under the Fourth Amendment would be the so-called "button factories." These factories are nominally engaged in the activities related to a treaty, and would most likely show too little evidence of prohibited activity to allow foreign inspectors to

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[50]Paul O'Sullivan, "The Role of the Preparatory Commission in Creating the International Regime," in Brad Roberts ed. The Chemical Weapons Convention Implementation Issues, (Washington D.C.: Center for Strategic and International Studies, 1992), 11.

[51]Michael P. Walls, "The Private Sector and Chemical Disarmament." in Brad Roberts, ed. The Chemical Weapons Convention: Implementation Issues, (Washington D.C: Center for Strategic and International Studies, 1992) 42.

obtain a search warrant from a U.S. court.[52] Other reasons exist to ease the fear of domestic conflict. First, the CWC negotiators did an excellent job of addressing state and commercial security by including such things as advance notice and "managed access" in the inspection regime. One of the major goals of the U.S. negotiating team was to ensure that national and commercial security was preserved:

> ...the USA in particular seems to have less interest in an 'effective verifiable' CWC than in preventing potential abuse of the challenge verification mechanism. The USA seems more interested in its own security than in detecting possible violation if the CWC by other countries...There have been some suggestions that the U.S. Senate may look more favorably upon ratifying a CWC that also protects U.S. security instead of one which may not be completely verifiable.[53]

The Stockholm International Peace Research Institute noted that domestic concerns were a primary goal for the United States.

Second, national governments should implement legislation to delimit the procedural and substantive rights and obligations of the commercial industry in complying with the CWC.[54] In short, states may have to exercise some control over their private chemical industries while maintaining faith in the CWC's built-in safeguards.

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[52]Allen S. Crass, Verification: How Much is Enough?, (Lexington Ma: D.C. Health and Company, 1985), 215.

[53]"Negotiations on the Chemical Weapons Convention," SIPRI Yearbook, 1992. World Armaments and Disarmaments. (London: Oxford University Press, 1992,) 156.

[54]Walls, 42.

4. Personnel Requirements

One very important task for the inspectorate is to maintain a high-quality staff for the institutions created by the CWC. The effectiveness of such an ambitious program will require setting a high standard of excellence in technical and other areas and generating an esprit de corps that supports the objective. The demands of verification will be at their most critical right after the convention comes into force. It will not be possible to have a slow buildup of expertise during the years immediately following 1995. The verification system must be at a high level of readiness from the very beginning.[55] Compiling the necessary amount of trained personnel will not be easy, partly because United Nations salary scales are declining and partly because service in the CWC program will most likely disrupt career paths in either national administration or industry.[56]

5. Commercial Industry

The answer to many technological and personnel problems, as well as ratification problems is to obtain the support of the commercial chemical industry. Generally, Western Chemical Industries have collaborated actively in developing the CWC. Their continued support will have a positive influence in key governments, reassure developing nations and help develop a basis for enhanced trade and

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[55]Robert Mikulak, "The Chemical Weapons Convention's Preparatory Commission," in Brad Roberts ed., The Chemical Weapons Convention Implementation Issues, (Washington D.C: Center for Strategic and International Studies, 1992), 12.

[56]O'Sullivan, 9.

cooperation.[57] At the operational level, the chemical industry will be the primary source of many of the individuals who will be drawn to the CWC's administrative and technical organizations. For these reasons it is vital to maintain positive relations between the OPCW and commercial industry. Negative, or uncooperative relations with the commercial chemical industry could be extremely detrimental to the goals of the CWC.

D. CONCLUSION

The verification regime of the Chemical Weapons Convention represents an ambitious attempt to rid the world eventually of chemical weapons. The two-pronged attack represents a commitment to assuring compliance while at the same time respecting national and commercial security. The ability of the Executive Council to block frivolous or abusive challenge inspections, coupled with a nation's right to accept or deny nominations to the inspection team and the concept of managed access should allow each state to adopt domestic legislation to ensure the compliance of the commercial sector. The treaty will require full commitment by its signatories in ratification, compliance and financial support. The verification teams will require highly trained personnel who are willing to interrupt their careers to support the CWC efforts. In short, even though the treaty has been signed, there is still much to accomplish before it becomes a useful tool in chemical warfare disarmament.

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[57]O'Sullivan, 10.

Regrettably, mutual trust does not exist in today's world. Interestingly enough, the verification systems which are now essential because of lack of trust could, by the assurance of compliance they can provide, become one of the most powerful tools for building trust. In short, the more absolute the verification -born in mistrust- the greater the progress towards absolute trust.[58]

[58]R.E. Roberts, "Verification Problems -Monitoring of Conversion and Destruction of Chemical Warfare Agent Plant," Chemical Weapons: Destruction and Conversion, Stockholm International Peace Research Institute (London: Taylor & Francis Ltd.) 129.

IV. CWC VERIFICATION PROCEDURES APPLIED TO THE NPT

A. COULD IT WORK?

It would appear that the similarity between the chemical and nuclear weapons industries will make it easy to create a new NPT verification system in the image of the CWC's. However, it is not clear that reproducing the CWC inspection procedures for the NPT would be effective or in the best interests of the parties involved. This chapter will analyze first reasons why the CWC verification regime would work for the NPT. It will then illustrate the reasons why it may not work. Finally, it will discuss why it may not be in the best security interest for nuclear weapons states like the United States to promote such a verification regime.

B. REASONS WHY THE CWC VERIFICATION REGIME WOULD WORK FOR THE NPT

1. THE LOGIC OF VERIFICATION

Both the CWC and the NPT address the difficult problem of reducing the overwhelmingly large numbers of weapons of mass destruction. The primary tool to enforce the goals of each treaty is the verification process. The logic of modern verification is the is explained below:

- The principal objective is to prevent the production or proliferation of certain types of weapons.

- Simply preventing the final production stage is not sufficient. Verification of non-production is has become aimed at earlier phases of production.

- The task of verification would be much easier if all materials that are necessary for production of weapons could be prohibited altogether. However, most of these materials and installations are also used for permitted civil purposes.

- Verification of non-proliferation will therefore be directed at verifying that materials and installations that could be used for production of prohibited weapons are only used for their permitted purposes.[59]

This logic applies to both the chemical and nuclear industries, whether defense or commercially related. But it is academic more than realistic. The actual differences in the nuclear and chemical industries make them quite different vis a vis ease of verification.

2. COMPARISONS BETWEEN NUCLEAR AND CHEMICAL WEAPONS

a. Defining A "Weapon"

One way that the NPT verification regime would have an advantage over the CWC is that the definition of a nuclear weapon is more evident than that of a chemical weapon. A nuclear weapon is a near-critical mass of uranium and/or plutonium designed as a fission or a fusion weapon. A trigger of fissionable material ignites the fusion of thermonuclear material. The precise design of the weapon depends on the function of the bomb and the manner in which it is deployed, but the general

[59]ter Haar and De Klerk, 200.

classification of the weapon is clear.[60] The definition of "chemical weapon" lacks the same clarity.

A precise definition of a chemical weapon is contained in the CWC but the treaty falls short. The CWC defines a chemical weapon as one in which:

> Its chemical action on life process can cause death, temporary incapacitation or permanent harm to humans or animals. This includes all such chemicals regardless of their origin or their method of production, and regardless if whether they are produced in facilities, munitions or elsewhere.

This definition lacks the clarity of the nuclear weapons definition. It does not, for instance, define the origin of toxicity, level of toxicity or a minimum amount of the chemical that would cause death or harm. The chemical scheduling process delineated in the CWC helps by offering operational definitions of chemicals, but theoretically, almost any chemical could be considered to fall under the CWC definition.

While searching for a precise definition of a weapon may appear to be an academic pursuit, it has significant practical application. In the arena of international laws and treaties, precise definitions are necessary. It would be extremely difficult to control or ban a weapon that could not be accurately identified. In consideration of the many uses of both chemical and nuclear materials, a precise accounting of what differentiates between military use and peaceful use would be a prerequisite.

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[60]Leonard S. Spector, Going Nuclear, (Cambridge: Ballinger Publishing Company, 1987), 333.

b. Weapons Production Materials

From a weapons production point of view, the nuclear weapons manufacturing process would be easier to monitor than the chemical weapons process. Chemical weapons production facilities need not be large or elaborate, and require little space compared to nuclear production plants. In contrast, nuclear processing plants are usually large and comparatively small in number. There are far more permutations of ingredients used to make chemical weapons than nuclear ones. The nuclear weapons industry works with only a few compounds, such as uranium oxide, hexaflouride and metal as well as plutonium oxide and plutonium metal.[61] Additionally, ingredients used in making chemical weapons, especially rudimentary weapons such as chlorine gas, are considerably more readily available than many of the ingredients used in the manufacture of nuclear weapons.[62]

The largest technical barrier to nuclear arms production is obtaining the weapons grade material for the weapon's core.[63] Neither highly enriched uranium nor plutonium occurs naturally in nature, so the material must be obtained from other states or locally produced. Obtaining these materials from other states is difficult, but not impossible. Regional organizations such as the Agency for the Prohibition of

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[61]ter Haar and de Klerk, 203.

[62]Fortunately, the amount of a chemical agent needed to be militarily relevant is much greater than in the nuclear arena. Even for super-toxic substances, one needs to stockpile at least 100 tons. This is a huge amount compared to the 8kg of plutonium and the 25 kg of enriched uranium needed to make one nuclear weapon.

[63]Spector, Going Nuclear, 327.

Nuclear Weapons in Latin America and the Caribbean (OPANAL)as well as the IAEA monitor all transfers of fissionable material. But states can obtain this material. There are legitimate uses for low-enriched uranium (3% U^{235}), such as in "light water reactors," (commonly used in the United States and most other countries). Highly enriched uranium can be used in research reactors.[64] The IAEA was created as a watchdog to ensure that enriched uranium and plutonium do not become diverted from peaceful use. Although experts differ on the overall effectiveness of the IAEA in monitoring transfers of nuclear material, its safeguard organization does make it difficult for a state desiring fissionable material to secretly obtain it from a producer.

Clandestine production of enriched uranium and plutonium is complicated and difficult to conceal. A list of what is required to produce enriched uranium shows the degree of difficulty a state would face in attempting to conceal the production and enrichment of uranium ore. A state would need:

- uranium deposits;
- a uranium mine;
- a uranium mill (for processing uranium ore into uranium oxide concentrate, or yellowcake);
- a conversion plant (for purifying yellowcake and converting into the gas uranium hexaflouride);
- an enrichment plant (for enriching uranium hexaflouride into the isotope U^{235}); and

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[64]Stockholm International Peace research Institute, Safeguards Against Nuclear Proliferation, (Cambridge: MIT Press, 1975), 1.

- a capability to convert the uranium hexaflouride gas into solid uranium oxide or metal.[65]

Currently, South Africa, Argentina and Pakistan have all developed independent uranium enrichment capabilities. Israel, Brazil and India are known to be at various stages of enrichment development.[66]

To produce plutonium, a state would need a plutonium production reactor. Again the possibility of maintaining such a clandestine production facility is minimal. Plutonium production plants emit large, easily detectable, amounts of heat into the environment. For example, a set of clandestine reactors capable of producing one ton of plutonium a year would produce waste heat at an average yearly rate of about 3 million killowats. This is equal to the total energy consumption of a U.S. city of three-hundred thousand.[67] This heat output, whether to the atmosphere or into a body of water would be easily detected by satelite infrared thermal sensors. Essentially, the difficulty of manufacturing or otherwise obtaining the proper material for nuclear weapons production still creates a natural safeguard limiting proliferation. The IAEA and similar regional organizations, which cover 95 percent of all nuclear installations

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[65]Spector, Going Nuclear, 329.

[66]Leonard S. Spector, Nuclear Proliferation Today, (Cambridge: Ballinger Publishing Company, 1984), 336.

[67]Frank Hippel and Barbara G. Levi, "Controlling the Source," Arms Control Verification, K. Tsipis et. al eds. (McLean VA: Pergamon-Brassey's International, 1986), 377.

in non-nuclear weapons states, enforce this natural safeguard with programs of their own.[68] Together with the inherent problems in clandestinely manufacturing nuclear materials, these safeguards continue to keep the nuclear industry's material unnacounted for at a minimum.

3. COMPARISONS IN THE INDUSTRIAL SECTOR

The similarity between the chemical and nuclear sciences extends to their respective commercial industries Here too, the nuclear industry appears to lend itself more readily to an inspection regime. The following sections will illustrate some examples of how the commercial nuclear industry would allow a similar verification process.

a. Number Of Production Facilities

The chemical industry is widespread and diverse. It works with a large number of chemical processing plants scattered about the globe. The OPCW has estimated that it will initially inspect approximately 1000 facilities that produce scheduled chemicals throughout the world, requiring an estimated 2000 inspections. But this estimation is expected to grow considerably larger after the initial baseline inspections are concluded.[69] On a smaller scale, IAEA statistics show that in 1992

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[68]The Department for Disarmament Affairs, The United Nations Disarmament Yearbook, (New York: United Nations Publications, 1990), 272.

[69]Four years after the CWC enters into force the number of possible inspection sites is expected to be in the thousands. The reason is that facilities producing non-scheduled chemicals will then become eligible for inspection. Additionally, the number of potential sites for challenge inspections is unlimited.

there were 813 nuclear-related facilities worldwide that required 2047 inspections.[70] For the time being, the number of inspection sites for the IAEA will remain relatively stable. The IAEA has estimated that there are 72 future nuclear sites currently in production, far fewer than the expected number of future chemical inspection sites.[71]

b. Material Unaccounted For

As stated in the previous chapter, the MUF within the chemical industry can sometimes be estimated in terms of hundreds of tons, simply due to the large quantities of chemicals used in the industry. But the nuclear weapons industry is inherently more precise in the monitoring of MUF. The nuclear industry can be considered a closed production cycle: it uses expensive, easily measurable material in relatively small amounts. Raw materials, products and byproducts are all closely monitored. The high cost of nuclear materials and the danger of criticality dictate an extremely close material accountancy within the industry. For these reasons, it is no surprise that very accurate material accountancy is already an important part of industrial as well as IAEA standards. With current standards enforced by the IAEA, the nuclear industry produces a manageable amount of MUF, especially compared to the chemical industry. The amount of MUF from the nuclear industry usually runs at one percent or less.[72] This small amount of MUF is certainly more manageable than

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[70]Dorn and Rolya, 46.

[71]"International Datafile," IAEA BULLETIN, Vol 35, No. 3, 1993, 52.

[72]Operators accuracy for reprocessing is $\pm$1% for reactors and for enrichment it is $\pm$0.2%. R. Rometsch et al. Safeguards 1974-1985, Proceedings of the IAEA

the tons of chemicals that disappear every year, and is far less likely to be diverted to prohibited use.

c. Existing Verification Organizations

Perhaps the greatest reason the NPT could foster a verification regime similar to the CWC is that the infrastructure for inspection already exists. The IAEA already conducts inspections worldwide; the only changes needed would be in the inspection guidelines. The IAEA is similar to OPCW; in fact the OPCW was modeled after the IAEA. IAEA personnel are sufficiently trained for such a task, and the technology for both inspecting and monitoring is readily available. Other organizations such as Euratom and OPANAL would be available for assistance, though the bulk of the work would still have to fall on the IAEA. As a functioning affiliate of the U.N. the IAEA's worldwide jurisdiction would be key to international coperation during inspections.

4. CONCLUSION

There are many reasons why the theoretical application of the CWC verification regime would be suitable for a comprehensive NPT verification regime. The smaller amounts of materials used, the fewer manufacturing sites the difficulty of hiding enrichment facilities, and the existing IAEA safeguards all indicate that more intrusive verification methods would be easily applied. But as the next section will

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Conference on safeguarding nuclear material, October 1975, p. 9.

illustrate, this application may not only be more difficult than expected, it may also less desirable, especially for technologically advanced nations, like the United States.

C. REASONS WHY THE CWC VERIFICATION REGIME WOULD NOT WORK FOR THE NPT

As easily as the NPT seems to lend itself to a CWC-type verification regime, the practical application of such a system would not be nearly as easy. This section will examine several reasons why the NPT would not be as easily verified as the NPT under similar verification regimes and will raise questions about security issues the United States would have to address before agreeing to such rules.

1. CONCEPTUAL DIFFICULTIES

The following are several examples of how the NPT organization may not readily adapt to a verification system similar to the CWC. The problems discussed here result from the IAEA and NPT systems as well as the nuclear industry, and would apply to all parties of the treaty.

a. Different Goals of the Two Treaties

The CWC and the NPT differ in their objective. The CWC has been created to rid the world completely of chemical weapons. The Nuclear Non-Proliferation Treaty accepts the existence of nuclear weapons and aims to control their horizontal proliferation. From a verification point of view, this is an important difference.

The OPCW is charged with first monitoring the destruction of these weapons and later, ensuring they are not built at all. While this will be no easy task, verification becomes inherently easier when the process determines the simple question of existence.[73] After a period of ten years, all chemical weapons are to be destroyed, according to the CWC. After the year 2005, if a country is discovered to possess, manufacture or transfer a chemical weapon, it is in violation of the treaty.[74] For many chemicals, including all on Schedule 1, their presence is all that needs to be discovered in order to detect treaty violations.

In one sense, this logic applies to the NPT. The function of IAEA safeguards is to report on the diversion of special fissionable material for the manufacture of nuclear weapons. The sudden presence of *significant* amounts of enriched uranium or plutonium in a state where there was once none would raise suspicions of IAEA inspectors. But the term "significant" creates a forum for subjective interpretation. For example, there is no reason for a country to have a supply of mustard gas after 2005, but highly enriched uranium has commercial uses. States can obtain uranium under IAEA safeguards. Therefore, the question shifts from the simple

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[73]Joseph J. Romm, "Verification and National Security," Arms Control Verification, K. Tsipis et al eds. (Mclean VA: Pergamon-Brassey's International, 1986), 37.

[74]States can apply to the OPCW for an extension of the ten year deadline if they cannot meet it. The notion that this was built into the treaty itself suggests that it is likely an extension will be granted, especially to the United States and Russia. These two states have an estimated collective total of 70,000 tons of agent to destroy. See Paul Doty's "The Challenge of Destroying Chemical Weapons," Arms Control Today, October, 1992, 25-29.

presence or absence of a material to what amount is *militarily significant* and what is the actual intended use of the material, a far more difficult task of an inspection team.

An excellent example of the difficulty IAEA inspectors face in determining NPT violation is the case of the U.N. inspections in Iraq following the Gulf War. The IAEA inspection teams in Iraq eventually uncovered documentation of the Iraqi nuclear weapons production program, but this evidence uncovered after over four months of inspections and countless bureaucratic battles with Iraqi officials.[75] The inspection teams had no problem finding nuclear materials in Iraq but proving they were earmarked for a weapons project was, for a short while, impossible.

The subjectivity of IAEA inspections is one reason why the verification regime of the CWC may not be effective for the NPT. The OPCW has the tremendous task of regulating an enormous amount of chemicals. But this task is made easier in many cases because subjective considerations such as intent and significant amount are not involved. The IAEA has a smaller amount of accountable material to monitor, but there is more to determine than the presence or absence of material, which would make the IAEA tasks more complicated than those of expected of the OPCW.

b. Inspecting Military Installations

The CWC allows for the inspection of "any equipment, as well as any building housing such equipment, that was designed, constructed or used at any time

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[75]An excellent article on the IAEA inspections in Iraq can be found in Leslie Thorne's "IAEA Inspections in Iraq," IAEA Bulletin, Vol. 34, No. 1, 24.

since 1946 [for chemical weapons related activities]." This includes both military and civilian facilities. Parties to the CWC have no options concerning which facilities may be inspected.

But the IAEA safeguards are different. Not all civilian facilities are covered by the safeguards, and no military installations are covered.[76] A comprehensive verification regime would not be supported by such a policy. If needed, a state could simply create an ad hoc military facility around existing nuclear facilities to prevent them from unwanted inspections. Additionally, in both the United States and Russia, nuclear weapons are deployed by military agencies, but weapons assembly and dismantlement are handled by civilian or quasi-civilian agencies: the Department of Energy (DOE) in the United States and the Ministry of Atomic Energy (MINATOM) in Russia.[77] In this case, IAEA safeguards only apply to nuclear weapons at each "end" of their lives. This creates a large time gap in which nuclear weapons will/not be monitored. The IAEA monitors fissionable material, not weapons. Any attempt to create an inspection regime like the CWC would require a hard look at the existing inspection rules and the openness of military installations. It is unlikely that such openness will be allowed by any technologically advanced party,

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[76]Non-nuclear weapons states must allow inspections at all nuclear facilities ("full scope" inspections) if they are parties to the NPT. This does not apply to the nuclear weapons states.

[77]Dr. Thomas L. Neff, "Finding Common Solutions," IAEA Bulletin, Vol. 35, No.3, 51.

including the United States. The added proliferation guarantees may not outweigh the potential security risks.

One might cite the INF Treaty as an example where a weapons monitoring regime has succeeded. The INF Treaty has shown success in allowing on-site inspections on missile bases as well as on destruction and former production sites. But the INF is a limited treaty. It covers only American and former Soviet intermediate range weapons, a total of 2,700 missiles.[78] A large multilateral treaty with provisions alowing open inspection of all civilian missile installations and military facilties would require tremendous growth of the IAEA. IAEA studies have shown that just including all civilian nuclear facilities into the IAEA regime would triple its current workload.[79] Including military installations into IAEA safeguards is highly unlikely because of security and cost concerns.

2. SECURITY ISSUES

Besides the difficulty in adapting the NPT to a CWC inspection program, there are important security concerns for the U.S. to consider before entering such an agreement.

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[78]U.S. Arms Control & Disarmament Agency, Understanding the INF Treaty, (Washington D.C: U.S. Government Printing Office), 10-11.

[79]Jon Jennekens, "IAEA Safeguards: A Look at 1970-1990 and Future Prospects," IAEA Bulletin, Vol. 32, No. 1, 1990, 10.

a. Comprehensiveness Of Inspection Regime

The CWC allows for inspections at all weapons production, destruction and storage facilities. However, the inspection regime also extends inspection rights beyond the scope of the chemicals and their precursors. Inspections may be held at facilities involved in all stages of chemical manufacture, as well as storage and destruction sites of all chemical weapons delivery platforms and munitions. Essentially, no part of the chemical weapons system is immune from ispection. All nuclear weapons states will need to consider the implications of a similar treaty concerning nuclear weapons. Allowing inspectors into a fertilizer plant to inspect for chemicals is not the same as allowing them into a missile production site, or a nuclear powered submarine. The U.S. Navy currently operates approximately 100 nuclear powered surface ships and submarines. Each of them could be inspected under a CWC-like verification regime. National research laboratories such as Los Alamos or Lawrence Livermore National Laboratory could be subject to short-fuzed challenge inspections, which could allow inspectors into the buildings within 108 hours. As one the most technologically advanced nations in the world the United States has much to consider. A cost-benefit analysis between the added non-proliferation value of such a comprehensive verification regime and allowing inspections of all sensitive facilities must be carefully examined before committing to a more intrusive NPT verification regime.

b. Technology Transfer

In terms of technical advantage, the United States may have the most to lose and the least to gain from a comprehensive verification regime. There are no documented cases of espionage using IAEA inspectors to gather technical information. The integrity of IAEA inspectors has never been questioned; both the IAEA and the CWC require complete discretion from their inspectors, and generally, their integrity is respected worldwide.

But there are also IAEA safeguards that protect a host nation from compromise. Host states are allowed to deny individual inspectors the right to inspect their facilities. Under the CWC, states must protest individual inspectors when nominated to the inspection team. Should a dispute erupt between a host states and the state of an inspector, the host state has little recourse but to allow the individual into their facilities. Although a state may appeal to the OPCW to prevent a certain inspector from entering a facility, if that inspector has been duly appointed to the roster of inspectors, there may be little the OPCW can do. The question arises then, do technologically advanced nations such as the United States really want inspectors from around the globe to have virtually unlimited access to their nuclear facilities?

c. Reluctance to Eliminate Nuclear Weapons

The NPT accepts the presence of nuclear weapons because the nuclear weapons states who wrote the treaty wanted to retain their own nuclear arsenals. Essentially, *they still do.* The nuclear weapons states have not decided to relinquish

their strategic weapons. Despite START I and II, the INF, and all other nuclear weapons and testing treaties, the United States, Russia, China, France and Great Britain still maintain nuclear weapons and have made no attempt to entirely rid themselves of them. In fact, the 1992 U.S. National Military Strategy of the United States declares:

> The need for nuclear deterence is a continuing one whether the nation is at peace or our troops are reponding to a contingency...The sheer size of the old Soviet Arsenal means the requirement for nuclear deterrence will be with us for years to come.[80]

The overwhelming number of signatories to the CWC show that most nations desire to rid the Earth of chemical weapons. But the "nuclear club" and other nations with advanced nuclear programs have not shown the same enthusiasm for eliminating all nuclear weapons.

The "threshold countries", Pakistan, India and Israel, are even less likely to terminate their nuclear programs, or even agree to a full disclosure program like the one in the CWC. These states all have immediate regional security concerns, and nuclear weapons may be their only guarantee of security. Full disclosure by any of these nations could even *boost* regional nuclear proliferation. If either Pakistan or India were to discover the other had a significant nuclear advantage, it would most likely strive to eliminate it by bolstering its own nuclear arsenal. Full disclosure by Israel could lead to a similar Arab buildup.

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[80]National Military Strategy of the United States, (Washington D.C: U.S. Government Printing Office, 1992), 13,20.

The difference between the goal of the CWC and a new NPT is not likely to change. The nuclear powers will not readily sign a treaty requiring them to relinquish all of their nuclear weapons. Other states will not openly declare their possession of nuclear weapons. The CWC parties have agreed to eliminate chemical weapons completely. Without a similar agreement, a comprehensive verification system for nuclear weapons may prove too costly and complicated to succeed.

D. CONCLUSION

There are strong reasons supporting a CWC styled verification regime for the NPT. The rarity of weapons grade materials, precision of the nuclear industry and the difficulty of operating a secret nuclear weapons all indicate that the nuclear industry is an optimum arena for such a verification system. But the opposing reasons are equally sound. Because the NPT does not attempt to eliminate all nuclear weapons, and will not support a demanding verification system. the IAEA does not inspect military facilities; it is not even prepared to inspect all civilian facilities. But most important are the security concerns. A comprehensive verification regime for nuclear weapons would open many doors that nuclear weapons states may desire to keep closed. Until advanced states are prepared to relinquish their nuclear weapons and share military and as well as industrial technology, highly intrusive verification regime like the CWC's will not work for the NPT.

V. CONCLUSION

The 1995 deliberations on the Non-Proliferation Treaty will take place in a world fundamentally different from the one in which the Treaty was negotiated. The U.S.-Soviet competition, which dominated international relations for the past 45 years, has dissipated. Yet, the end of the Cold War does not mean the end of international disagreements, but rather a change in the scope, character and conditions of international competition. There are two ways in which this new competition may take place. The first scenario is that states that face declining or uncertain future support from outside powers may turn to nuclear weapons for their security. The Korean Peninsula, South Asia and the Middle East are all possible candidates for this scenario, and even Europe may fall into this line of thinking.[81] The alternate scenario is that these states will conclude that their security interests are served best by fully supporting the NPT and minimizing the reasons for their neighbors to desire nuclear weapons. In either case, the NPT will have a major role to play. In the first scenario, the NPT and IAEA Safeguards could be used to combat proliferation and enforce actions against states that pursue nuclear weapons. States that desire nuclear weapons technology will have to get it from other states, and NPT regulations would be their major obstacle. In the second case, the nations foregoing a nuclear arsenal may

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[81]Lawrence Scheinman, "The Non-Proliferation Treaty: On the Road to 1995," IAEA Bulletin, Vol. 34, No. 1, 1992, 33.

appeal for a stronger verification system to ensure their security. Both cases would require bolstering the IAEA system to meet growing challenges.

Other challenges facing the IAEA are in the near future. For example, the reduction of nuclear warheads resulting from START I and the INF Treaty has created a stockpile of weapons grade material. The United States claims that the Department of Energy will dismantle about 2000 warheads annually. Russia estimates their capacity to be 1500-2000 warheads per year. At these rates, the two states will "produce" 15-20 tons of highly enriched uranium and 5-8 tons of weapons grade plutonium a year.[82] A number of proposals for dealing with this material have been advanced, most of which are costly, and offer no positive incentives to handle the job safely.[83] The IAEA could be called on to monitor this additional material once it becomes separated from the weapons. The IAEA has not traditionally been tasked with disarmament duties, but it may be called upon to aid in a verification role. Suitably designed IAEA safeguards may be used to verify the undisturbed storage of dismantled material, or its peaceful use in various types of reactors.[84]

There are reasons why a CWC verification regime could surface during future NPT negotiations. Its intrusivity and inclusivity will appeal to many states, especially to those without nuclear industries of their own. The non-nuclear weapons states have

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[82]Thomas Neff, "Finding Common Solutions," IAEA BULLETIN, Vol. 25, No. 3, 51.

[83]Neff, 51.

[84]Hans Blix, "Verification of Nuclear Non-Proliferation: Securing the Future," IAEA Bulletin Vol. 35, No. 3, 1993, 5.

little or no technology to lose from the disclosures required within CWC verification procedures. The opposite may be true for nuclear weapons states. A comprehensive verification regime for nuclear weapons would allow inspections and disclosures that technologically advanced states, like the United States, would most likely oppose.

Clearly, the future holds great opportunity for the IAEA to expand its role in the global effort to control the proliferation of nuclear weapons. The NPT will most likely remain the primary instrument to sustain this worldwide effort, for it remains the only global treaty of its kind. But to enforce the Treaty in the future, the IAEA will need to change. Many verification techniques that were once satisfactory have been overrun by time and technology, and are now obsolete.[85] At a minimum, it will require more personnel to monitor the world's growing supply of fissionable material. There may also be a requirement for a fundamental shift in verification philosophy toward a more intrusive regime that is as comprehensive as the verification regime of the CWC.

But such a shift is highly unlikely in the near future. Although nuclear science and industry seem to lend themselves to a CWC-like verification regime with great ease, there are difficult obstacles to overcome. The nuclear powers are not ready to eliminate all their nuclear weapons, and are unlikely to sign or ratify any treaty requiring them to do so. Without a commitment to a nuclear weapons free world, the NPT is not likely to contain a strict verification regime like that of the CWC.

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[85]Jon Jennekins, "IAEA Safeguards: A Look at 1970-1990 and Future Prospects," IAEA Bulletin Vol. 32 No.1, 5.

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